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(54) ROTATABLE REVERSE METAGLENE ASSEMBLY

DREHBARE UMGEKEHRTE METAGLENANORDNUNG

ENSEMBLE MÉTAGLÈNE INVERSE ROTATIF

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Description

[0001] The present invention relates generally to shoulder prostheses, and more particularly to shoulder prostheses configured for use in rotator cuff deficient shoulders.

[0002] The rotator cuff is made up of a group of tendons and muscles which includes the deltoid, the supraspinatus, the infraspinatus, the infrascapular, and the smaller round. When massive rupture occurs of the rotator cuff, only the deltoid muscle remains functional which is insufficient to enable proper operation of the shoulder joint. Moreover, improper operation of the shoulder joint due to massive rotator cuff rupture when left untreated will cause erosion or other defects in the subchondral surface of the glenoid. Thus, it is common that a patient who is being treated for a rotator cuff deficiency will also have erosion or other defects of the subchondral surface of the glenoid.

[0003] Certain procedures have been used to treat rotator cuff deficient shoulders which have the above described glenoid erosion or defects. For example, the bone of the glenoid may be asymmetrically prepared to create an appropriately configured support to receive a typical metaglene component of a shoulder prosthesis. Asymmetric preparation of bone involves removing more bone from one side of the glenoid in comparison to another in order to create an even support surface for receipt of the metaglene component. In another example, a bone graft is utilized in conjunction with implantation of a standard metaglene component, the bone graft being configured to fill the eroded or defected area of the glenoid so that the implanted metaglene component is appropriately supported. Yet another example involves interposition shoulder arthroplasty in which new tissue is placed between the damaged surfaces of the joint. In interposition shoulder arthroplasty, a tissue-type graft is sutured over the eroded or defected area of the glenoid so as to ease the pain of the damaged joint while allowing the shoulder joint to retain some function. Interposition shoulder arthroplasty is typically a temporary solution to shoulder joint deficiency, and standard shoulder reconstruction will typically follow after several months.

[0004] Each of these treatments has significant drawbacks. For example, implanting a metaglene component in bone that has been asymmetrically prepared results in healthy bone stock being sacrificed. Use of a bone graft in conjunction with a metaglene component may have complications due to graft non-union and not all patients have adequate bone stock available for such a procedure. Interposition shoulder arthroplasty tends to be a short term solution that masks the shoulder joint deficiency, only to be followed some time later by more invasive conventional shoulder reconstruction in which humeral and glenoid components are implanted. This two step process results in more risk and inconvenience to the patient since two surgical procedures are involved.

[0005] US-A-2011/0106266 discloses a scapular component of a shoulder joint prosthesis having a base plate with two anchoring pins on its medial face. A screw extends through the base plate to fasten a glenosphere to the base. A pair of bores extend through the anchoring pins and can receive screws for fixing the component in place in the patient's scapula.

[0006] The invention provides a shoulder prosthesis kit as defined in claim 1.

[0007] Optionally, the kit includes a second metaglene component including (i) a second body defining an outer diameter, and (ii) a second augment extending medially from the second body, wherein each of the plurality of bearing component cavities are configured to couple with the second body.

[0008] Optionally, the second metaglene component further includes a second void defined by a portion of the second body and a portion of the second augment.

[0009] Optionally, the first augment has a size and a shape, the second augment has a size and a shape, and at least one of the size and the shape of the first augment is different from the size and the shape of the second augment.

[0010] Optionally, the first void has a size and a shape, the second void has a size and a shape, and at least one of the size and the shape of the first void is different from the size and the shape of the second void.

[0011] Optionally, the first augment has a first augment radius, and the second augment has a second augment radius, the second augment radius being different than the first augment radius.

[0012] Optionally, the first metaglene component has a first post axis and a first medial augment line defining a first augment displacement, and the second metaglene component has a second post axis and a second medial augment line defining a second augment displacement, the second augment displacement being different than the first augment displacement.

[0013] A metaglene assembly for use in a shoulder prosthesis can include a metaglene body, an augment, a void, at least one fastener hole, and at least one fastener. The metaglene body has a lateral, prosthesis-facing side, and a medial, bone-facing side. The augment extends medially from the medial, bone-facing side of the metaglene body. The void is defined by a portion of the medial, bone-facing side of the metaglene body and a lateral portion of the augment. The fastener hole extends from the void through the augment. The fastener is configured to extend within the fastener hole.

[0014] A shoulder prosthesis kit can include a plurality of metaglene components and a plurality of bearing components. Each of the metaglene components has a body, an augment extending from the body, and a void defined by a portion of the body and a portion of the augment. At least two of the metaglene components' bodies have outermost diameters that are different from one another. At least two of the bearing components have innermost diameters that are slightly larger than the outermost diameters of respective metaglene components.

[0015] The invention therefore provides a shoulder prosthesis for use in a rotator cuff deficient shoulder that involves glenoid erosion or defects. The shoulder prosthesis can be used in a rotator cuff deficient shoulder that involves glenoid erosion or defects, in such a way that can help to conserve healthy bone stock. The shoulder prosthesis can be used in a rotator cuff deficient shoulder that involves glenoid erosion or defects, in such a way that it does not necessarily require a bone graft to be implanted in conjunction with the shoulder prosthesis. The shoulder prosthesis can be used in a rotator cuff deficient shoulder that involves glenoid erosion or defects without necessarily promoting a two stage surgical approach to restoring proper function of the shoulder joint.

[0016] Embodiments of the invention are described below by way of example with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of a shoulder prosthesis implanted in a scapula and a humerus of a patient to form a joint between them.

FIG. 2 is a cross sectional view of a glenoid component of the shoulder prosthesis of FIG. 1.

FIG. 3 is an exploded cross sectional view of the glenoid component of FIG. 2, shown with the fasteners removed for clarity of description.

FIG. 4 is a side perspective view of a metaglene assembly that can be used in the glenoid component of the shoulder prosthesis of FIGs. 1 to 3.

FIG. 5 is a side perspective view of the metaglene component of the metaglene assembly of FIG. 4.

FIG. 6 is a schematic diagram of a side projection of a portion of the metaglene component of FIG. 5.

FIG. 7 is a bottom view of the metaglene component of FIG. 5.

FIG. 8 is a side elevational view of the metaglene component of FIG. 5.

FIG. 9 is an alternative embodiment of a metaglene component configured for use in the metaglene assembly of FIG. 4.

FIG. 10 is yet another alternative embodiment of a metaglene component configured for use in the metaglene assembly of FIG. 4.

FIGS. 2 and 3 show components which do not have all of the features of the invention. They are included in this document to aid understanding of the invention.

[0017] As used herein, the terms "medial" and "lateral" are anatomical directional terms referring to positioning relative to the centre of the body receiving the shoulder prosthesis. The term "medial" means closer to the centre of the body. The term "lateral" means further from the centre of the body.

[0018] Referring to the drawings, FIG. 1 shows a shoulder prosthesis 10 which includes a glenoid component 12 and a humeral component 14 that are configured to cooperate with each other to form a shoulder joint. The glenoid component 12 is configured to be attached to a glenoid of a scapula 16, while the humeral component 14 is configured to be implanted in an intramedullary canal 18 of a humerus 20 as shown in FIG. 1.

[0019] The humeral component 14 includes a stem 22 that is configured to be received in the intramedullary canal 18 as shown in FIG. 1. The humeral component 14 further includes a humeral bearing component 24 that has a humeral bearing surface 26.

[0020] The glenoid component 12 of the shoulder prostheses 10 is shown in more detail in FIGs. 2 and 3. In particular, as shown in FIG. 2, the glenoid component 12 includes a metaglene assembly 13 and a glenoid bearing component 32. The metaglene assembly 13 includes a metaglene component 30 and a plurality of fasteners 34. The metaglene component 30 is configured to be attached to the glenoid of the scapula 16 (shown in FIG. 1) with the fasteners 34, while the glenoid bearing component 32 is configured to be coupled to the metaglene component 30 as shown in FIGs. 2 and 3.

[0021] As shown in FIG. 3, the metaglene component 30 includes a metaglene body 36 having a lateral, prosthesis-facing side 38 and a medial, bone-facing side 39. The lateral, prosthesis-facing side 38 defines a lateral metaglene plane 90. The lateral, prosthesis-facing side 38 of the metaglene body 36 is substantially circularly shaped and defines a metaglene body centre (not shown). The metaglene body 36 further has an external peripheral wall surface 44 having an outermost diameter 94 that defines an external coupling surface that extends between the lateral, prosthesis-facing side 38 and the medial, bone-facing side 39. The external peripheral wall surface 44 tapers slightly outwardly from the lateral, prosthesis-facing side 38 to the medial, bone-facing side 39 such that the metaglene body 36 is slightly larger at the medial, bone-facing side 39 than at the lateral, prosthesis-facing side 38. The external peripheral wall surface 44 extends completely (through 360 degrees) around the periphery of the metaglene component 30. The metaglene body 36 has defined therein a plurality of metaglene body fastener holes 37A, 37B, and two other metaglene body fastener holes (not shown). The metaglene body fastener holes 37A, 37B are defined, in part, by walls having concave bearing seats 50.

[0022] The metaglene component 30 also includes a post 46 extending from the metaglene body 36. The post 46 defines a post axis 92 that is perpendicular to the lateral metaglene plane 90 and passes through the metaglene body centre. The post 46 is attached to the metaglene body 36 by being integrally formed therewith. A plurality of ribs 49 are defined on the post 46. The post 46 has defined therein a central passage 48. The central passage 48 extends through the metaglene body 36 as shown in FIGs. 2 and 3. The post 46 also includes an internally threaded wall portion 52.

[0023] As stated above, the metaglene assembly 13 further includes metaglene body fasteners 34A, 34B, and two other metaglene body fasteners (not shown). Each

of the metaglene body fasteners 34A-D includes a head having a convex surface to be matingly received by a respective concave bearing seat 50 of a respective metaglene body fastener hole 37A-D, as shown in FIGs. 2 and 3, such that the metaglene body fasteners 34A-D do not extend above the concave bearing seats 50. Additionally, each of the metaglene body fasteners 34A-D is configured to be adjustable to any one of a variety of angles with respect to the metaglene body 36 due to the spherical shape of both the fastener heads and the concave bearing seats 50.

[0024] Two of the metaglene body fasteners can be locking fasteners wherein advancement of an expander (not shown) into a head recess (not shown) of its respective head causes the fastener head to expand thereby locking the head and thus the metaglene body fastener to the metaglene body 36. Alternatively, more or fewer than two of the metaglene body fasteners can be locking fasteners.

[0025] As is shown in FIGs. 2 and 3, the glenoid bearing component 32 includes a substantially hemispherical glenoid bearing surface 60 that defines an axis "X". The glenoid bearing surface 60 has an access opening 61 defined therein. The glenoid bearing surface 60 is configured to mate with the humeral bearing surface 26 of the humeral bearing component 24 as shown in FIG. 1. In particular, the glenoid bearing surface 60 defines a convex surface and the humeral bearing surface 26 defines a concave surface which is configured to receive the convex glenoid bearing surface 60. Alternatively, the glenoid bearing surface 60 may be configured to define a concave surface and the humeral bearing surface 26 may be configured to define a convex surface which is configured to receive the alternative concave glenoid bearing surface 60.

[0026] In addition, the glenoid bearing component 32 defines a cavity 62. The cavity 62 defines an internal wall surface 64 having an innermost diameter 65 that defines an internal coupling surface. The internal wall surface 64 extends completely (through 360 degrees) around the cavity 62. The innermost diameter 65 is sized slightly larger than the outermost diameter 94 of the external peripheral wall surface 44 of the metaglene body 36, and the external peripheral wall surface 44 is positioned in contact with the internal wall surface 64 to form a friction fit connection between the glenoid bearing component 32 and the metaglene component 30 as shown in FIGs. 2 and 3. In order to facilitate the friction fit connection, both the external peripheral wall surface 44 and the internal wall surface 64 are tapered so that the surfaces 44, 64 when joined together form a Morse taper connection.

[0027] The glenoid bearing component 32 further includes a screw 66 that is aligned with the axis X. As shown in FIG. 2, the glenoid bearing component 32 further defines a space 68 in which a head 69 of the screw 66 is retained by a washer 70. In particular, the glenoid bearing component 32 further defines an internally threaded wall 72 which meshes with external threads 73 of the washer 70. So retained, the screw 66 is free to rotate in relation to the bearing surface 60. The screw 66 includes a longitudinal axial channel 76 as shown in FIGs. 2 to 4. The screw 66 also includes an externally threaded portion 78 that is configured to meshingly engage the internally threaded portion 52 of the post as shown in FIGs. 2 and 3. Further details of the structure and operation of the screw and related components are disclosed in US-6953478.

[0028] FIG. 4 depicts a metaglene assembly 113 which can be used in the glenoid component 12 of FIGs. 1 to 3 in place of the metaglene assembly 13. The metaglene assembly 113 includes a metaglene component 130 and fasteners 156 and 158. FIG. 5 shows the metaglene component 130 in more detail. The metaglene component 130 is configured and used in substantially the same manner as the metaglene component 30 described above. The metaglene component 130, however, includes additional features described below which provide additional advantages over the metaglene component 30 of FIGs. 1 to 3.

[0029] As shown in FIG. 5, the metaglene component 130 includes a metaglene body 136, a post 146, an augment 140, and a void 180. The metaglene body 136 has a lateral, prosthesis-facing side 138 and a medial, bone-facing side 139. The lateral, prosthesis-facing side 138 of the metaglene body 136 defines a lateral metaglene plane 190 having a metaglene body centre 191. The post 146 defines a post axis 192 extending longitudinally through the post 146 perpendicularly to the metaglene plane 190. The metaglene component 130 is arranged substantially radially around the post axis 192. Thus, features of the metaglene component 130 can be referred to as being closer to or further from the post axis 192 regardless of the orientation of the metaglene component 130.

[0030] The augment 140 is attached to the medial, bone-facing side 139 of the metaglene body 136. The augment 140 is attached to the metaglene body 136 by being integrally formed therewith. Alternatively, the augment 140 can be removably attached to the metaglene body 136 by a coupling mechanism (not shown). For example, the coupling mechanism may include a post (not shown) attached to the augment and a recess (not shown) formed in the metaglene body 136, in which the post and recess mate in a friction fit manner to secure the augment 140 to the metaglene body 136.

[0031] The augment 140 has a lateral augment surface 181, a medial augment surface 182, a lateral portion 141, and a medial portion 142 and defines an external sidewall 143 that extends between the lateral augment surface 181 and the medial augment surface 182 and extends along both the lateral portion 141 and the medial portion 142. The void 180 is formed between the lateral augment surface 181 of the augment 140 and the medial, bone-facing side 139 of the metaglene body 136. The intersection between the external sidewall 143 and the medial

augment surface 182 forms an augment edge 184.

[0032] To clarify the arrangement and configuration of the features of the metaglene component 130, FIG. 6 depicts a projection of a side of the metaglene body 136 and the augment 140 on to a plane. As seen in FIG. 6, when viewed from a side perspective, the augment edge 184 (formed at the intersection of the external sidewall 143 and the medial augment surface 182) forms an augment arc 185 that extends along a portion of an augment circle 186. The augment circle 186 has an augment radius 187 that extends from the augment edge 184 to the centre of the augment circle 186. The augment edge 184 departs from the augment circle 186 near the intersection of the augment 140 with the metaglene body 136. A medial augment line 188 indicates where the augment edge 184 departs from the augment circle 186. The medial augment line 188 is parallel to the post axis 192 (shown in FIG. 4). Also shown most clearly in FIG. 6, the metaglene body 136 has a thickness 193.

[0033] FIG. 7 depicts an end view of the metaglene component 130 having an outermost diameter 194. The outermost diameter 194 is sized slightly smaller than the innermost diameter 65 of the glenoid bearing component 32 (shown in FIGs. 2 and 3) to form a frictional fit in a glenoid component as described above with relation to the glenoid component 12 of FIGs. 1 to 3. The external sidewall 143 of the augment 140 aligns with a portion of the external peripheral wall surface 144 of the metaglene body 136. In other words, the perimeter of the augment 140 coincides with a portion of the perimeter of the metaglene body 136. In the embodiment of the metaglene component 130 shown in FIG. 7, the external sidewall 143 of the augment 140 extends circumferentially for approximately a half of the extent of the external coupling surface 144 of the metaglene body 136. In other words, the external sidewall 143 of the augment 140 extends circumferentially for approximately 180 degrees around the periphery of the metaglene body 136. In other embodiments, however, the external sidewall of the augment can extend circumferentially for more than or less than a half of the extent of the external coupling surface of the metaglene body.

[0034] As shown in FIGs. 5 and 7, the metaglene component 130 has defined therein a plurality of metaglene body fastener holes 137A-D like the metaglene body fastener holes 37A-D described above with reference to the metaglene component 30 (shown in FIGs. 2 and 3). Additionally, the augment 140 of the metaglene component 130 has defined therein a plurality of augment fastener holes 145A, 145B, and 145C. The augment fastener holes 145A, 145B, and 145C are defined, in part, by walls having concave bearing seats 150 (shown in FIG. 5) like those of the metaglene body fastener holes 137A-D.

[0035] As can be seen in FIGs. 5 and 7, the augment fastener hole 145A aligns with the metaglene body fastener hole 137A. As used herein, when holes "align" they are oriented such that a fastener extending through a first hole can also extend through a second hole without changing angle. In contrast, the augment fastener holes 145B and 145C do not align with metaglene body fastener holes. Additionally, the augment fastener holes 145B and 145C extend through the metaglene component 130 at angles different than the angles at which the augment fastener hole 145A and the metaglene body fastener holes 137A, 137B, 137C, and 137D extend through the metaglene component 130. As shown in FIG. 6, the augment fastener holes 145A, 145B, and 145C can be accessed through the void 180. Due to the placement and the angle of the augment fastener holes 145B and 145C, lateral end openings 147 of augment fastener holes 145B and 145C are partially defined in the external side wall 143.

[0036] Returning now to FIG. 4, the metaglene assembly 113 further includes metaglene body fasteners 156 and augment fasteners 158. For simplicity, only two metaglene body fasteners 156 and one augment fastener 158 are shown. The metaglene body fasteners 156 can be identical to or different from the augment fasteners 158. The metaglene body fasteners 156 are configured to extend through the metaglene body fastener holes 137A, 137B, 137C, and 137D (shown in FIG. 5), and the augment fasteners 158 are configured to extend through the augment fastener holes 145B and 145C (shown in FIG. 5). The metaglene body fastener 156 that extends through the augment fastener hole 145A (shown in FIG. 5) is configured to additionally extend through metaglene body fastener hole 137A (shown in FIG. 5). However, as shown in FIG. 4, the metaglene body fastener 156 that extends through augment fastener hole 145A (shown in FIG. 5) does not necessarily extend through metaglene body fastener hole 137A (shown in FIG. 5).

[0037] Each of the metaglene body fasteners 156 includes a head having a convex surface configured to be matingly received by a respective concave bearing seat 150 of the respective metaglene body fastener hole 137A-D. Each of the metaglene body fasteners 156 is configured to be adjustable to any one of a variety of angles with respect to the metaglene body 136 due to the spherical shape of both the fastener heads and the concave bearing seats 150. Accordingly, depending on the angle at which a metaglene body fastener 156 is inserted through a metaglene body fastener hole 137, the metaglene body fastener 156 does not necessarily extend laterally beyond the plane 190 (shown in FIG. 5). Similarly, each of the augment fasteners 158 includes a head having a convex surface configured to be matingly received by a respective concave bearing seat 150 of the respective augment fastener hole 145A-D. Each of the augment fasteners 158 is configured to be adjustable to any one of a variety of angles with respect to the metaglene body 136 due to the spherical shape of both the fastener heads and the concave bearing seats 150. Accordingly, the augment fastener 158 does not typically extend into the void 180, although a portion of it may extend into the void 180 depending on the angle at which an augment fastener 158 is inserted through an augment

fastener hole 145.

[0038] When a shoulder prosthesis is implanted into a body, the appropriate metaglene component for use in the metaglene assembly is selected based on the properties of the defect(s) in the bones of the shoulder joint. To compensate effectively for the defect(s) in the shoulder, the best metaglene component has a metaglene body with the appropriate metaglene body thickness, an augment and metaglene body extending for an appropriate length relative to the post, and an augment extending at an appropriate angle relative to the metaglene body. These factors, among others, influence the particular size and shape of the metaglene component. As noted above, because the metaglene component is arranged substantially radially around the post, the metaglene component can be rotated and inserted at any angle appropriate to compensate for the defect(s) in the shoulder.

[0039] As shown in FIG. 8, the particular size and shape of the metaglene component 130 are dictated by the length of the augment radius 187, the metaglene body thickness 193, and the distance between the medial augment line 188 and the post axis 192, this distance being referred to as the augment displacement 189. Modifications of the particular size and shape of the metaglene component 130 include, for example, lengthening the augment radius 187 without changing the metaglene body thickness 193 or the augment displacement 189. This results in the augment and the metaglene body extending for a longer length relative to the post 146. The size of the void 180 is selected based on the size and shape of the metaglene component 130 such that the void 180 allows for optimized visualization of the lateral augment surface 181 and optimized access to the augment fastener holes 145.

[0040] To facilitate selection of the best components for implantation of a prosthetic shoulder, a kit can be formed including components having a variety of shapes and sizes. The kit can include more than one glenoid bearing component 32 having a variety of dimensions. For example, at least one glenoid bearing component 32 can have a larger innermost diameter 65 than another glenoid bearing component 32. The kit can also include more than one metaglene component 30 having a variety of dimensions. For example, at least one metaglene component 30 can have a larger outermost diameter 94 than another metaglene component 30. The kit can also include more than one metaglene component 130 having a variety of dimensions. For example, at least one metaglene component 130 can have a larger augment radius 187 than another metaglene component 130. Additionally, at least one metaglene component 130 can have a larger metaglene body thickness 193 than another metaglene component 130. Additionally, at least one metaglene component 130 can have a larger augment displacement 189 than another metaglene component 130. The kit can also include more than one type of fastener to be used as metaglene body fasteners 156 and as augment fasteners 158.

[0041] Using such a kit allows a doctor to select the best combination of components based on a patient's particular bone geometry and defect(s). For example, the doctor could select a glenoid bearing component 32 having a smaller innermost diameter 65 for a patient having a smaller shoulder. The doctor could select a shorter fastener to be used as a metaglene body fastener 156 or augment fastener 158 for a patient having a thinner depth of bone into which the implant is to be fastened. The doctor could also select a metaglene component 130 having the particular combination of larger metaglene body thickness 193, smaller augment displacement 189, and larger augment radius 187 to compensate for a bone defect having a particular depth, width and angle relative to the remaining bone. To further optimize the compensation of the implant and the fixation of the implant into the shoulder bones, the selected metaglene components can be inserted at any degree of rotation and the fasteners can be inserted through the metaglene components and into the bone at a range of angles.

[0042] In other embodiments discussed below, the particular size and shape of the metaglene components and voids can be different than those of the embodiment shown in FIGs. 4 to 8. Each alternative embodiment is suited for a different bone defect in the shoulder and, thus, each has particular benefits.

[0043] By way of example, FIG. 9 shows an alternative embodiment of a metaglene component 230 that is configured and used in substantially the same manner as the metaglene component 130 described above. The metaglene component 230 differs from the metaglene component 130, however, in size and configuration of the metaglene component and the void. In particular, the augment displacement 289 is smaller than the augment displacement 189 (shown in FIG. 8). Additionally, the augment displacement 289 is in the opposite direction relative to the void 280 than the augment displacement 189 relative to the void 180 (shown in FIG. 8). The augment radius 287 is larger than the augment radius 187 (shown in FIG. 8). Accordingly, the augment 240 and the void 280 shown in FIG. 9 have different shapes and configurations in relation to the metaglene component 230 than the augment 140 and the void 180 in relation to the metaglene component 130 shown in FIG. 8.

[0044] FIG. 10 shows another metaglene component 330 which is configured and can be used in substantially the same manner as the metaglene component 130 described above. The metaglene component 330 differs from the metaglene component 130 in size and configuration of the metaglene component and the void. In particular, the augment displacement 389 is smaller than the augment displacement 189 (shown in FIG. 8). Additionally, the augment radius 387 is larger than the augment radius 187 (shown in FIG. 8). Accordingly, the augment 340 and the void 380 shown in FIG. 10 have different shapes and configurations in relation to the metaglene component 330 than the augment 140 and the void 180 in relation to the metaglene component 130 shown

in FIG. 8.

[0045] Although not specifically depicted, other components can include any combination of augment displacement, augment radius, and metaglene body thickness that results in a functional metaglene component. Additionally, a component can have a combination of an augment displacement and an augment radius such that the post is attached only to the metaglene body or only the augment rather than to both the metaglene body and augment.

[0046] A metaglene assembly for use in a shoulder prosthesis can comprise:

a metaglene body having a lateral, prosthesis-facing side, and a medial, bone-facing side,
an augment extending medially from the medial, bone-facing side of the metaglene body,
a void defined by a portion of the medial, bone-facing side of the metaglene body and a lateral portion of the augment,
at least one first fastener hole extending from the void through the augment, and
at least one first fastener configured to extend within the at least one first fastener hole.

[0047] Optionally, the at least one first fastener includes a fastener head, and the at least one first fastener hole includes a fastener seat defined on the lateral portion of the augment, the fastener seat being configured to receive the fastener head such that the fastener head does not extend within the void.

[0048] Optionally, the metaglene assembly includes at least one second fastener hole extending through the metaglene body, and at least one second fastener configured to respectively extend within the at least one second fastener hole.

[0049] Optionally, a first hole of the at least one second fastener hole extends through the metaglene body and is aligned with a third fastener hole which extends through the augment.

[0050] Optionally, the said first hole is configured such that when a first fastener of the at least one second fastener is inserted through the lateral, prosthesis-facing side of the metaglene body, it extends through the void and into the first hole.

[0051] Optionally, the first fastener is configured such that, when the metaglene assembly is assembled, the first fastener extends through a medial portion of the augment.

[0052] Optionally, the at least one second fastener includes a fastener head, and the at least one second fastener hole includes a fastener seat defined on the lateral, prosthesis-facing side of the metaglene body, the fastener seat being configured to receive the fastener head such that the fastener head does not extend beyond a plane formed by the lateral prosthesis-facing side of the metaglene body.

[0053] Optionally, the metaglene assembly a post attached to at least one of the metaglene body and the augment.

[0054] Optionally:

a metaglene body perimeter formed by projecting an end view of the metaglene body onto a plane is approximately circularly shaped,
an augment perimeter formed by projecting an end view of the augment onto the plane is approximately semi-circularly shaped, and
the augment perimeter coincides with at least a portion of the metaglene body perimeter.

[0055] Optionally, the augment perimeter coincides with approximately 180 degrees of the metaglene body perimeter.

Claims

1. A shoulder prosthesis kit comprising:

a first metaglene component (130) including (i) a first body (136) defining an outer diameter, (ii) a first augment (140) extending medially from the first body, and (iii) a first void (180) defined by a portion of the first body and a portion of the first augment, and
a bearing component (32) defining a cavity (62) configured to couple with the first body, and having a bearing surface (60),
in which:

(a) at least one first fastener hole (145A, 145B, 145C) extends from the first void through the first augment,
(b) at least one second fastener hole (137A, 137B, 137C, 137D) extends through the body, and
(c) a first (145B, 145C) of the at least one first fastener holes extends through the first augment at an angle which is different from that of a second of the at least one first fastener holes and also different from the angle at which the at least one second fastener holes extend through the body so that the first of the first fastener holes does not align with any of the at least one second fastener holes,

characterised in that the kit includes a plurality of bearing components (32), each of the plurality of bearing components defining a cavity (62) configured to couple with the first body, and having a bearing surface (60) that is sized differently from the size of another of the plurality of bearing components, and
the second (145A) of the at least one first fas-

tener holes is aligned with a first (137A) of the at least one second fastener holes so that a fastener can extend through the said aligned holes without changing angle.

2. The shoulder prosthesis kit of claim 1, which includes a second metaglene component (230) including (i) a second body defining an outer diameter, and (ii) a second augment (240) extending medially from the second body, in which each of the plurality of bearing component cavities (62) is configured to couple with the second body.

3. The shoulder prosthesis kit of claim 2, in which the second metaglene component further (230) includes a second void (280) defined by a portion of the second body and a portion of the second augment (240).

4. The shoulder prosthesis kit of claim 3, in which the first augment (140) has a size and a shape, the second augment (240) has a size and a shape, and at least one of the size and the shape of the first augment is different from the size and the shape of the second augment.

5. The shoulder prosthesis kit of claim 3, in which the first void (180) has a size and a shape, the second void (280) has a size and a shape, and at least one of the size and the shape of the first void is different from the size and the shape of the second void.

6. The shoulder prosthesis kit of claim 3, in which the first augment (140) has a first augment radius, and the second augment (280) has a second augment radius, the second augment radius being different from the first augment radius.

7. The shoulder prosthesis kit of claim 3, in which the first metaglene component (130) has a first post axis (192) and a first medial augment line (188) defining a first augment displacement (189), and the second metaglene component has a second post axis and a second medial augment line defining a second augment displacement, the second augment displacement being different from the first augment displacement.

Patentansprüche

1. Schulterprothesensatz, umfassend:

eine erste Metaglenkomponente (130), die Folgendes umfasst: (i) einen ersten Körper (136), der einen Außendurchmesser bestimmt, (ii) eine erste Erhöhung (140), die sich medial von dem ersten Körper aus erstreckt, und (iii) eine erste Vertiefung (180), die von einem Anteil des ersten Körpers und einem Anteil der ersten Erhöhung bestimmt wird, und
eine Lagerkomponente (32), die einen Hohlraum (62) bestimmt, der ausgestaltet ist, mit dem ersten Körper gekoppelt zu werden, und die eine Lagerfläche (60) aufweist,
wobei:

(a) sich mindestens ein erstes Befestigungsloch (145A, 145B, 145C) von der ersten Vertiefung aus durch die erste Erhöhung erstreckt,
(b) sich mindestens ein zweites Befestigungsloch (137A, 137B, 137C, 137D) durch den Körper erstreckt, und
(c) sich ein erstes (145B, 145C) des mindestens einen der ersten Befestigungslöcher durch die erste Erhöhung in einem Winkel erstreckt, der sich von jenem eines zweiten des mindestens einen der ersten Befestigungslöcher unterscheidet, und der sich ebenfalls von dem Winkel unterscheidet, in dem sich das mindestens eine der zweiten Befestigungslöcher durch den Körper erstreckt, so dass das erste der ersten Befestigungslöcher mit keinem des mindestens einen der zweiten Befestigungslöcher ausgerichtet ist,

dadurch gekennzeichnet, dass der Satz eine Vielzahl von Lagerkomponenten (32) umfasst, wobei jede der Vielzahl von Lagerkomponenten einen Hohlraum (62) bestimmt, der ausgestaltet ist, mit dem ersten Körper zu koppeln, und eine Lagerfläche (60) aufweist, deren Größe sich von der Größe von einer anderen der Vielzahl von Lagerkomponenten unterscheidet, und
dass das zweite (145A) des mindestens einen der ersten Befestigungslöcher mit einem ersten (137A) des mindestens einen der zweiten Befestigungslöcher so ausgerichtet ist, dass sich ein Befestigungsmittel durch die ausgerichteten Löcher erstrecken kann, ohne den Winkel zu ändern.

2. Schulterprothesensatz nach Anspruch 1, der eine zweite Metaglenkomponente (230) umfasst, die Folgendes umfasst: (i) einen zweiten Körper, der einen Außendurchmesser umfasst, und (ii) eine zweite Erhöhung (240), die sich medial von dem zweiten Körper aus erstreckt, wobei jede der Vielzahl von Lagerkomponentenhohlräumen (62) ausgestaltet ist, mit dem zweiten Körper zu koppeln.

3. Schulterprothesensatz nach Anspruch 2, wobei die zweite Metaglenkomponente überdies (230) eine zweite Vertiefung (280) umfasst, die von einem Anteil des zweiten Körpers und einem Anteil der zwei-

ten Erhöhung (240) bestimmt wird.

4. Schulterprothesensatz nach Anspruch 3, wobei die erste Erhöhung (140) eine Größe und eine Form aufweist, die zweite Erhöhung (240) eine Größe und eine Form aufweist, und sich mindestens eines von der Größe und der Form der ersten Erhöhung von der Größe und der Form der zweiten Erhöhung unterscheidet.

5. Schulterprothesensatz nach Anspruch 3, wobei die erste Vertiefung (180) eine Größe und eine Form aufweist, die zweite Vertiefung (280) eine Größe und eine Form aufweist, und sich mindestens eines von der Größe und der Form der ersten Vertiefung von der Größe und der Form der zweiten Vertiefung unterscheidet.

6. Schulterprothesensatz nach Anspruch 3, wobei die erste Erhöhung (140) einen ersten Erhöhungsradius aufweist, und die zweite Erhöhung (280) einen zweiten Erhöhungsradius aufweist, wobei sich der zweite Erhöhungsradius von dem ersten Erhöhungsradius unterscheidet.

7. Schulterprothesensatz nach Anspruch 3, wobei die erste Metaglenkomponente (130) eine erste Pfostenachse (192) und eine erste mediale Erhöhungslinie (188) aufweist, die eine erste Erhöhungsverlagerung (189) bestimmt, und die zweite Metaglenkomponente eine zweite Pfostenachse und eine zweite mediale Erhöhungslinie aufweist, die eine zweite Erhöhungsverlagerung bestimmt, wobei sich die zweite Erhöhungsverlagerung von der ersten Erhöhungsverlagerung unterscheidet.

Revendications

1. Kit de prothèse d'épaule comprenant :

un premier composant (130) de métaglène incluant (i) un premier corps (136) définissant un diamètre extérieur, (ii) une première augmentation (140) s'étendant de façon médiane depuis le premier corps et (iii) un premier vide (180) défini par une partie du premier corps et une partie de la première augmentation, et
un composant d'appui (32) définissant une cavité (62) configurée pour se coupler avec le premier corps, et ayant une surface d'appui (60), dans lequel :

(a) au moins un premier trou (145A, 145B, 145C) d'élément de fixation s'étend depuis le premier vide à travers la première augmentation,
(b) au moins un deuxième trou (137A, 137B, 137C, 137D) d'élément de fixation s'étend à travers le corps, et
(c) un premier (145B, 145C) des au moins un premiers trous d'élément de fixation s'étend à travers la première augmentation selon un angle qui est différent de celui d'un deuxième des au moins un premiers trous d'élément de fixation et également différent de l'angle auquel les au moins un deuxièmes trous d'élément de fixation s'étendent à travers le corps de telle sorte que le premier des premiers trous d'élément de fixation ne s'aligne sur aucun des au moins un seconds trous d'élément de fixation, **caractérisé en ce que** le kit inclut une pluralité de composants d'appui (32), chaque composant de la pluralité de composants d'appui définissant une cavité (62) configurée pour se coupler avec le premier corps, et ayant une surface d'appui (60) qui est de taille différente de la taille d'un autre composant de la pluralité de composants d'appui, et

le deuxième (145A) des au moins un premiers trous d'élément de fixation est aligné sur un premier (137A) des au moins un deuxièmes trous d'élément de fixation de telle sorte qu'un élément de fixation peut s'étendre à travers lesdits trous alignés sans changer d'angle.

2. Kit de prothèse d'épaule la revendication 1, qui inclut un deuxième composant (230) de métaglène incluant (i) un deuxième corps définissant un diamètre extérieur, et (ii) une deuxième augmentation (240) s'étendant de façon médiane depuis le deuxième corps, dans lequel chaque cavité de la pluralité de cavités (62) de composant d'appui est configurée pour se coupler au deuxième corps.

3. Kit de prothèse d'épaule la revendication 2, dans lequel le deuxième composant (230) de métaglène inclut un deuxième vide (280) défini par une partie du deuxième corps et une partie de la deuxième augmentation (240).

4. Kit de prothèse d'épaule la revendication 3, dans lequel la première augmentation (140) a une taille et une forme, la deuxième augmentation (240) a une taille et une forme, et au moins l'une parmi la taille et la forme de la première augmentation est différente de la taille et de la forme de la deuxième augmentation.

5. Kit de prothèse d'épaule la revendication 3, dans lequel le premier vide (180) a une taille et une forme, le deuxième vide (280) a une taille et une forme, et au moins l'une parmi la taille et la forme du premier

vide est différente de la taille et de la forme du deuxième vide.

6. Kit de prothèse d'épaule la revendication 3, dans lequel la première augmentation (140) a un premier rayon d'augmentation, et la deuxième augmentation (280) a un deuxième rayon d'augmentation, le deuxième rayon d'augmentation étant différent du premier rayon d'augmentation.

7. Kit de prothèse d'épaule la revendication 3, dans lequel le premier composant (130) de métaglène a un premier axe (192) de montant et une première ligne d'augmentation médiane (188) définissant un premier déplacement d'augmentation (189), et le deuxième composant de métaglène a un deuxième axe de montant et une deuxième ligne d'augmentation médiane définissant un deuxième déplacement d'augmentation, le deuxième déplacement d'augmentation étant différent du premier déplacement d'augmentation.

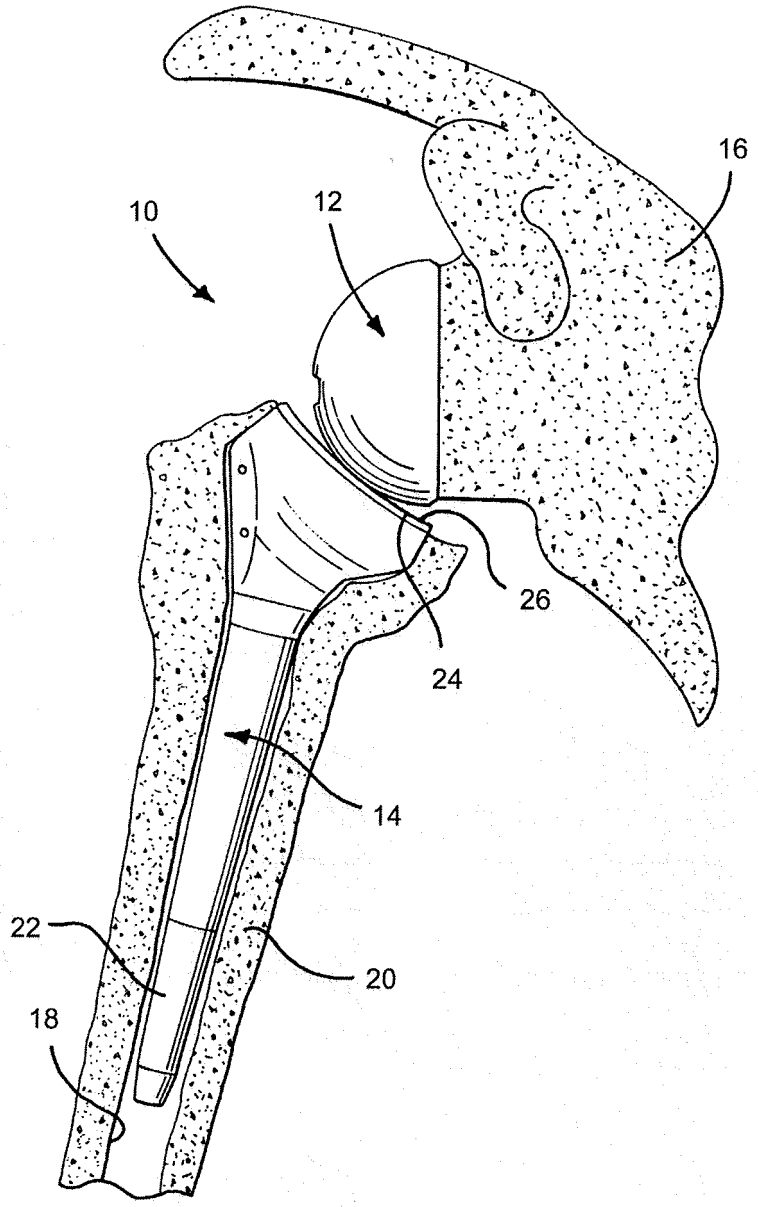

FIG. 1

Prior Art

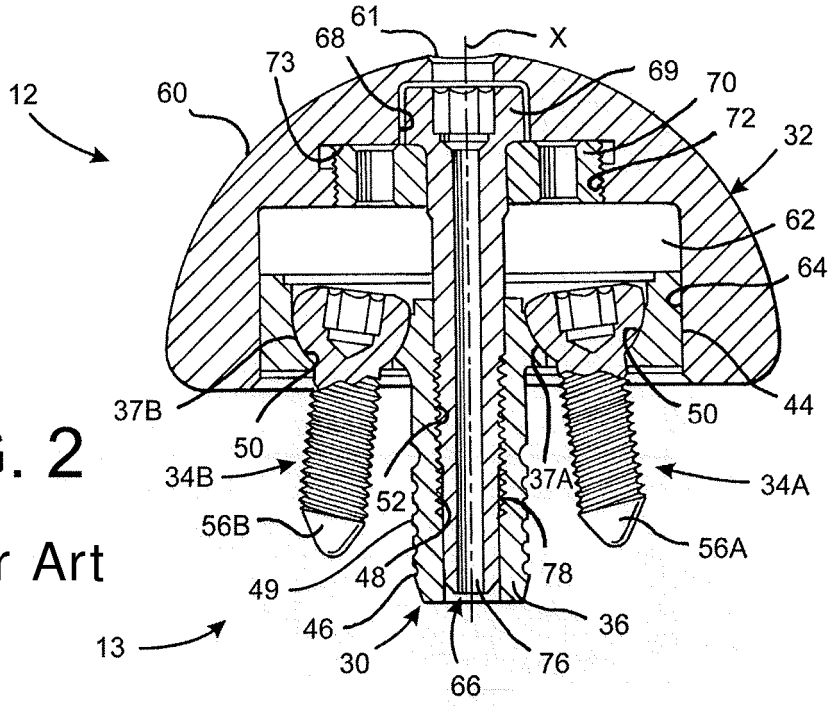

FIG. 2

Prior Art

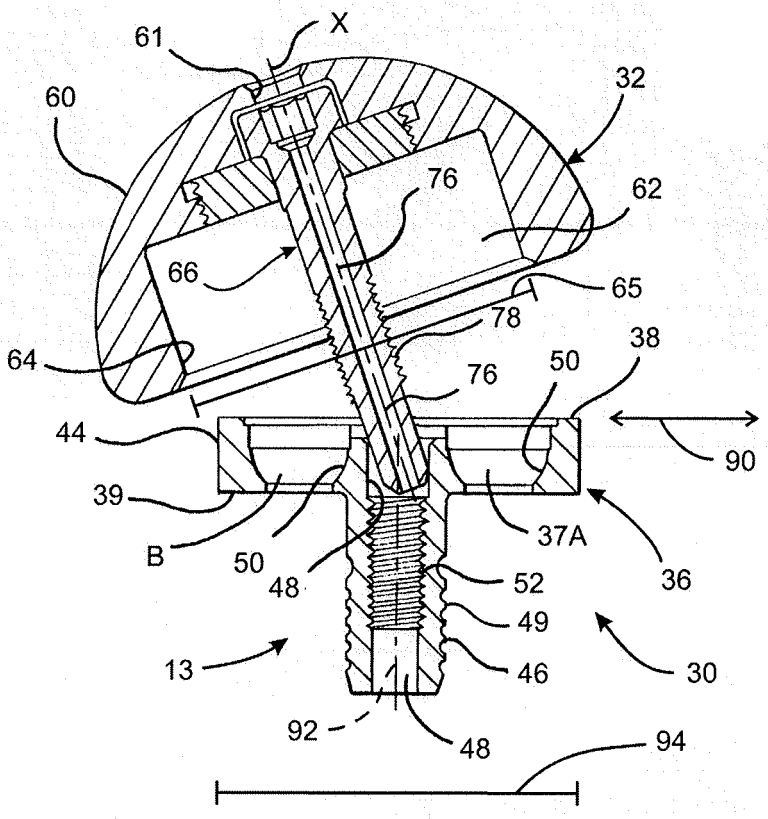

FIG. 3

Prior Art

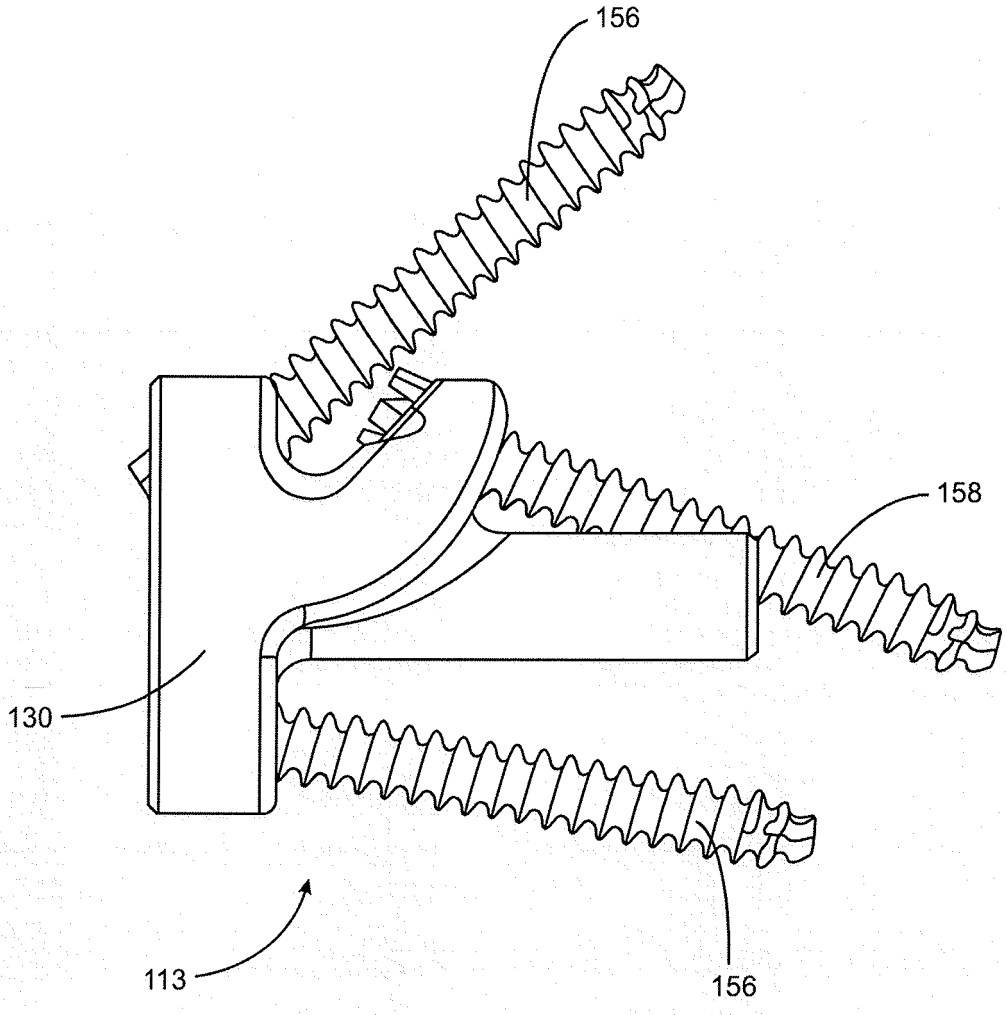

FIG. 4

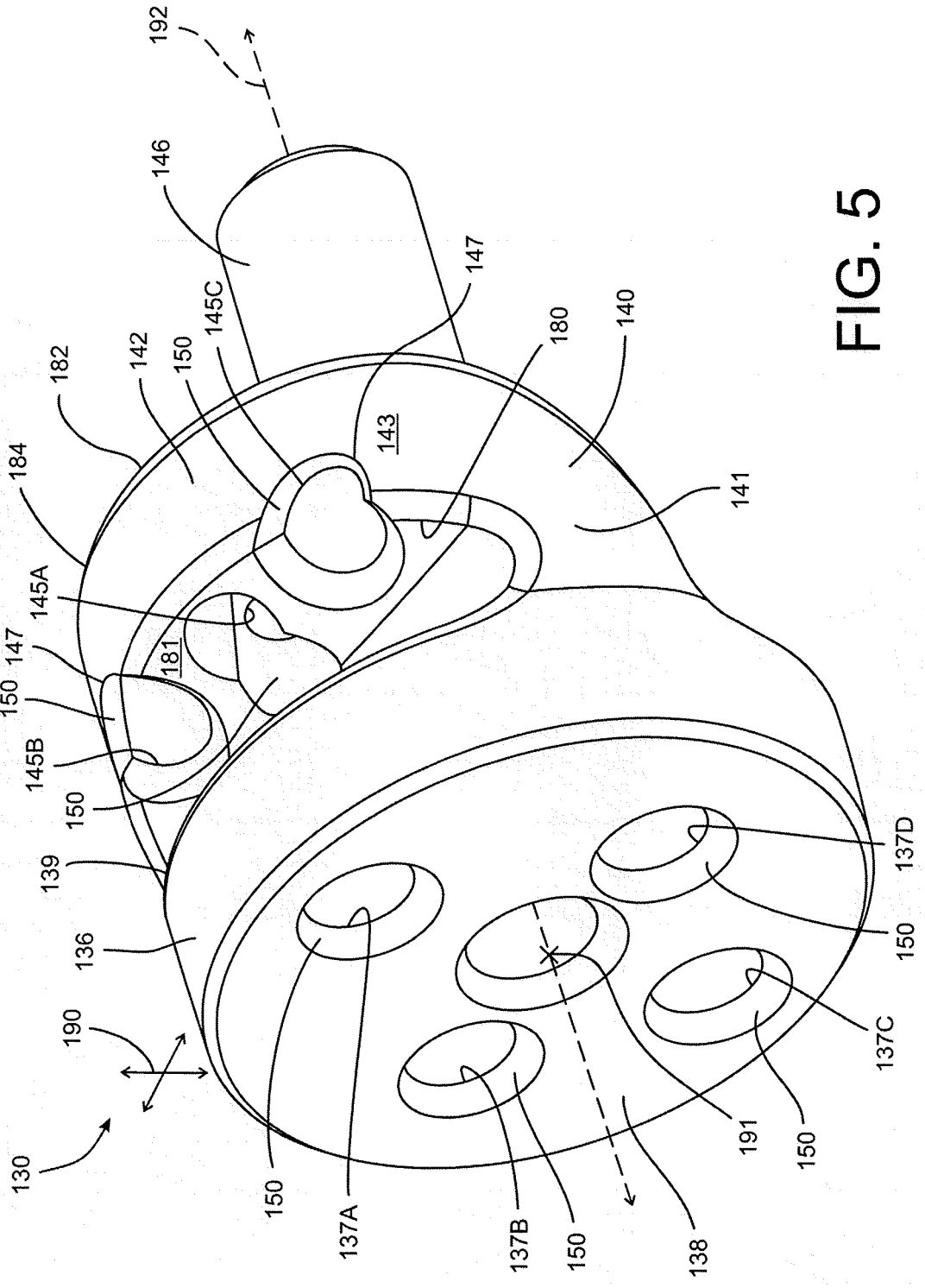
192
146
147
145C
142
150
182
180
140
184
143
141
145A
147
181
150
145B
150
139
137D
136
150
190
137C
130
191
150
150
137A
137B
150
138

FIG. 5

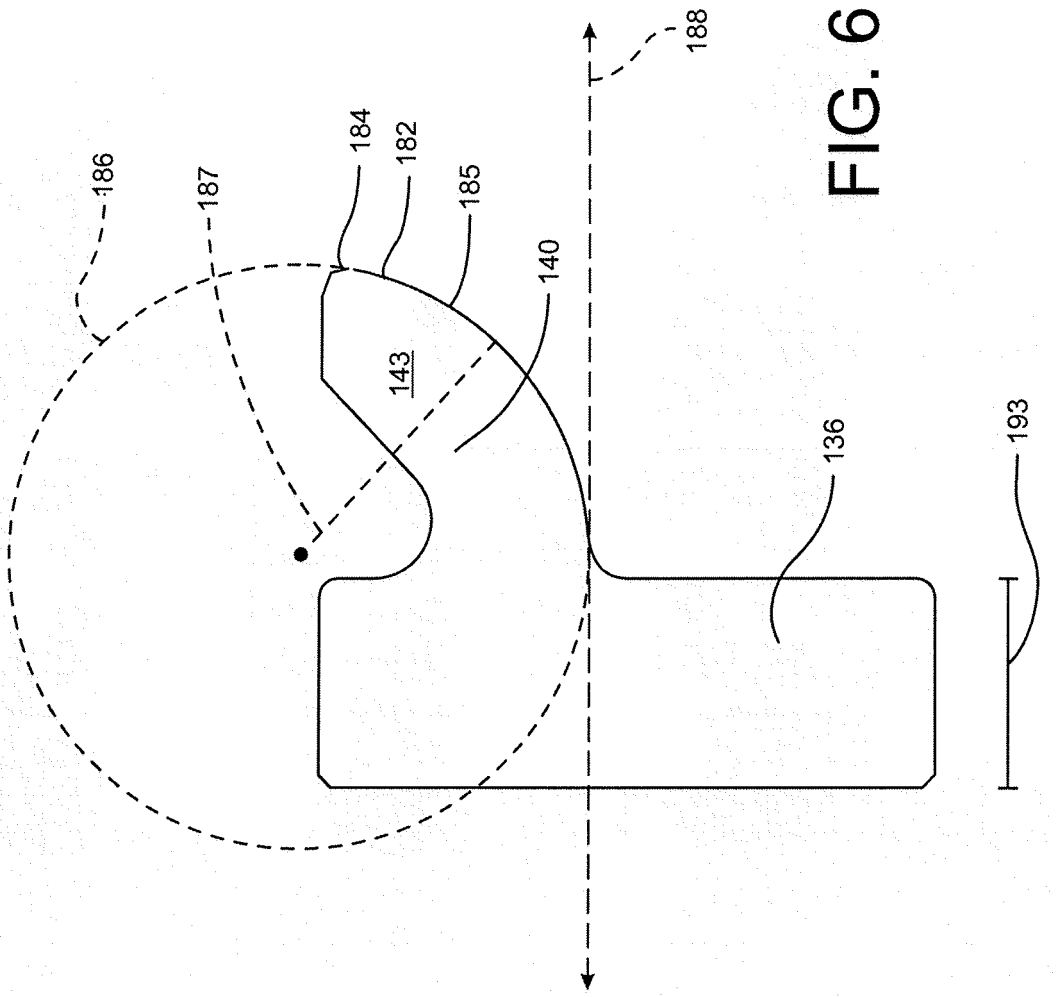

FIG. 6

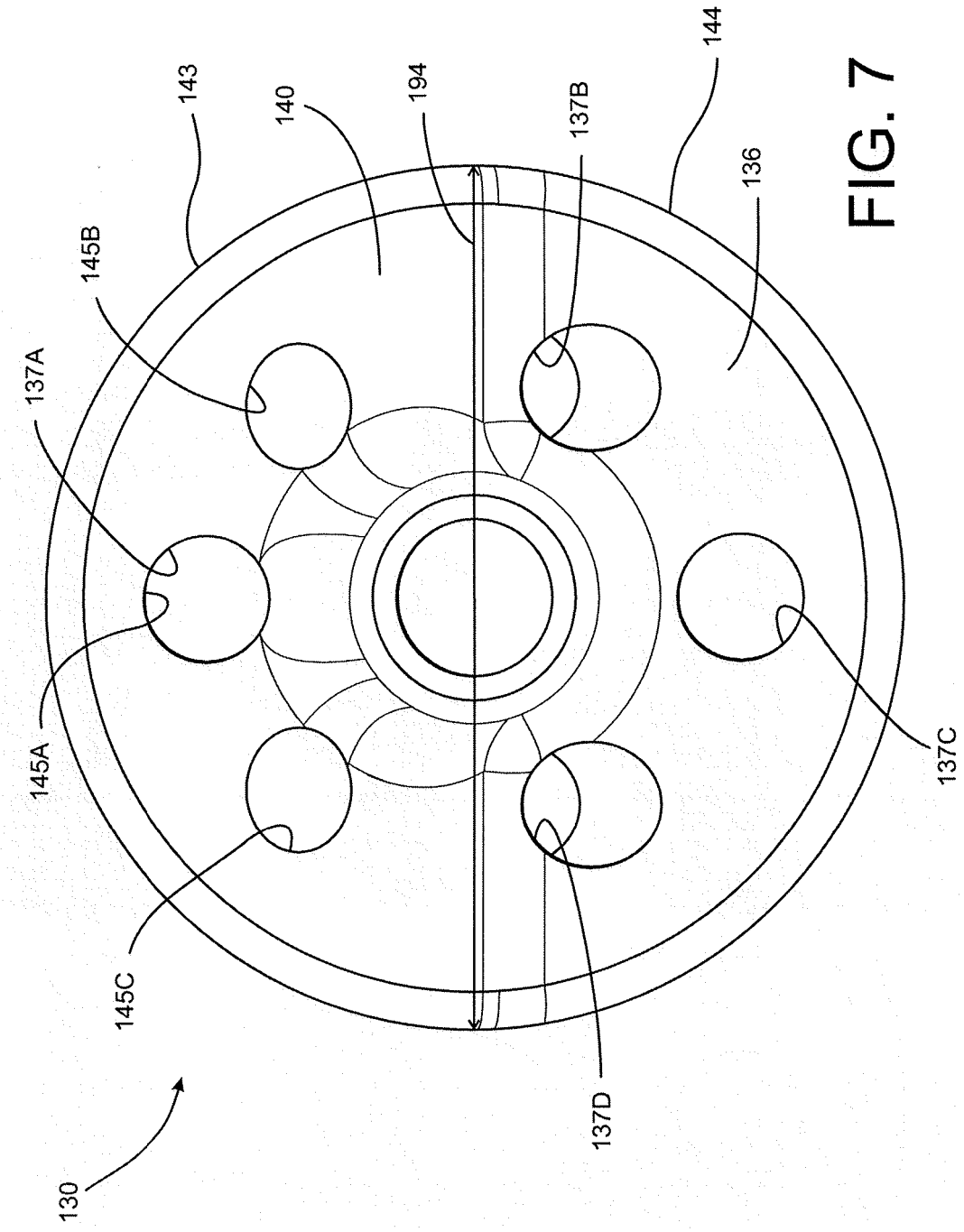

FIG. 7

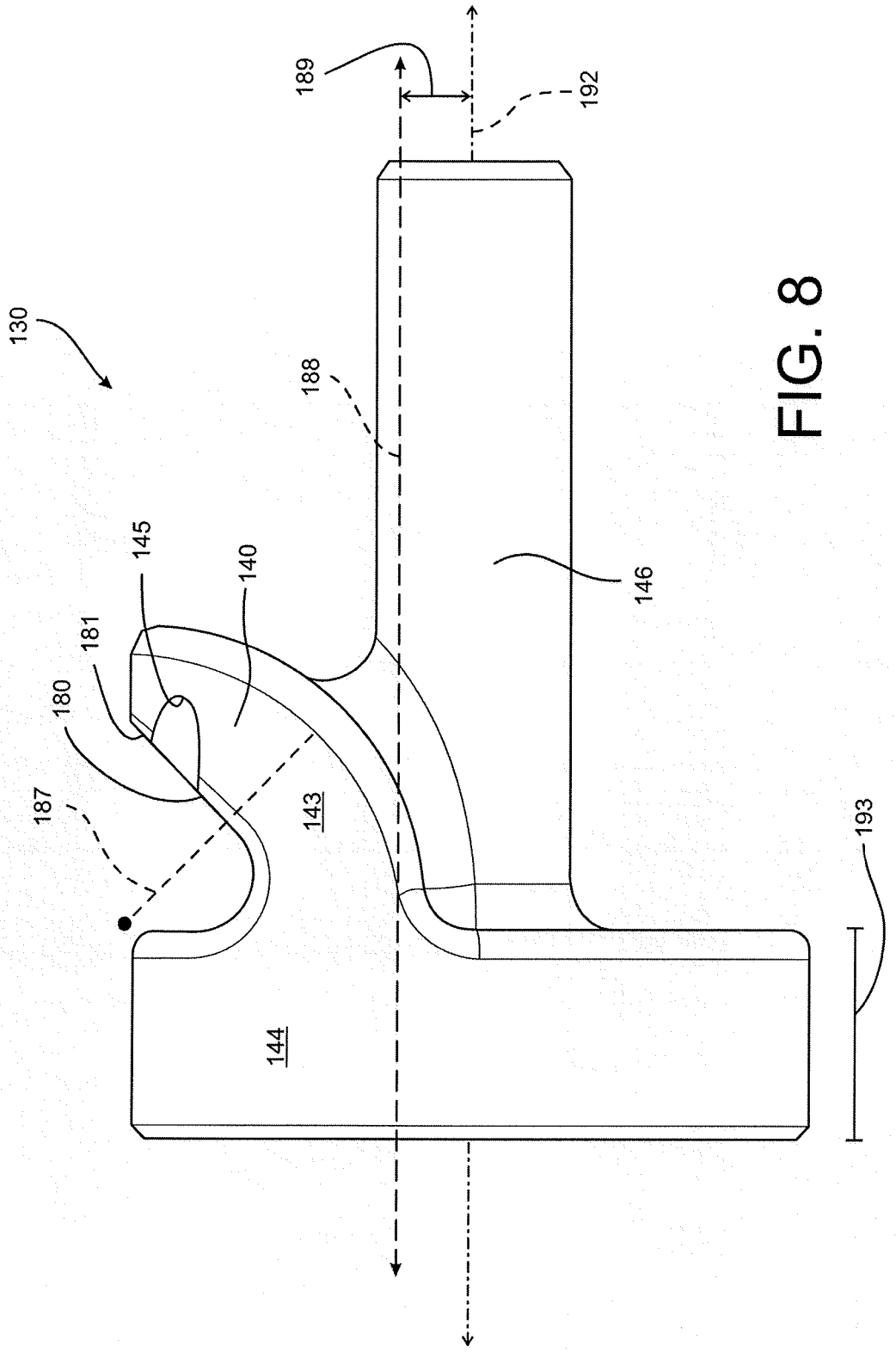

FIG. 8

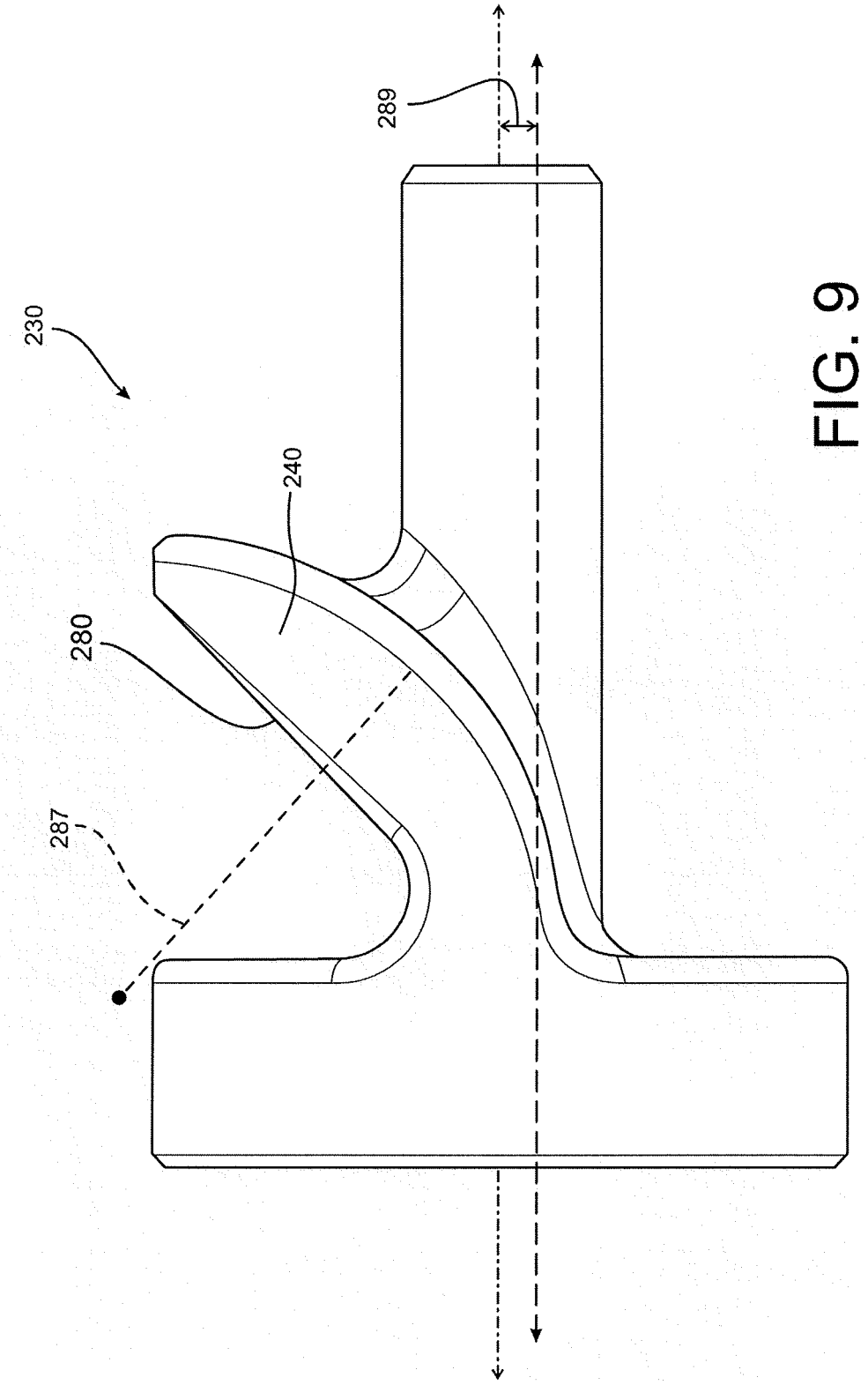

FIG. 9

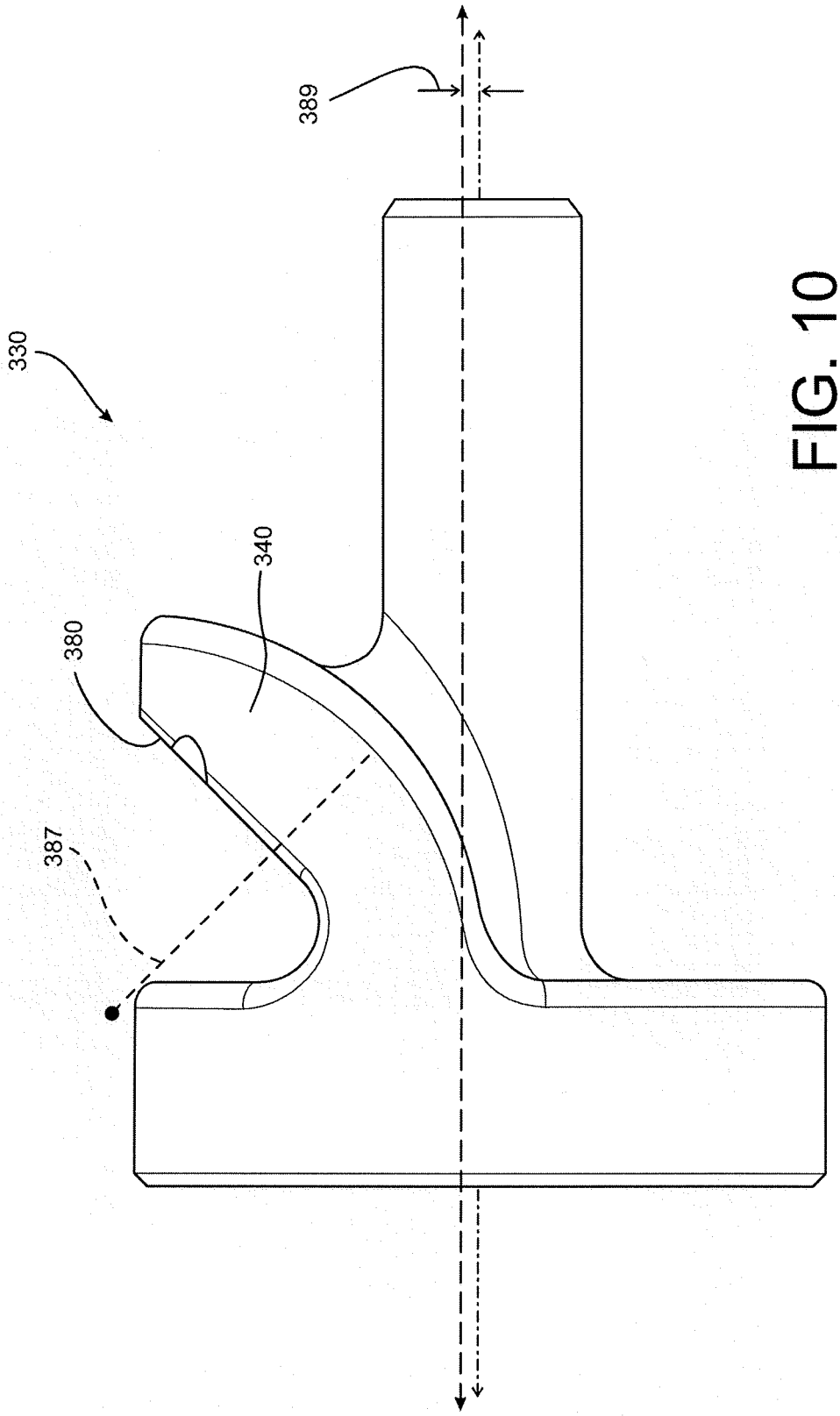

FIG. 10

REFERENCES CITED IN THE DESCRIPTION

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- US 6953478 B **[0027]**